

VERTICAL COUCH CALIBRATION

Introduction

This procedure leads the user through the steps required to set the high and low software limits for vertical motion of the Patient Table. The software limits are only in effect when the Patient Table is in the normal mode of operation. With the Patient Table in the service mode, there are no upper and lower limits to vertical couch motion.

The basic steps in the procedure are:

- Turn on the system
- Position the Patient Table
- Logout
- Gantry to Standby
- Run the calibration scenario
- Reboot the host computer

Required Materials

1. Laptop computer with CanPro software loaded and a HyperTerminal shortcut set up for the Mx8000.
2. CanPro Security Dongle.
3. Peak-CAN Parallel to RS-232 Adapter Dongle.
4. Straight Edge long enough to span the width of the Patient TableTop Support and hang over the edge by several inches.
5. RS-232 null cable or straight through cable with null adapter for communication with the PTV MCB.

Procedure:

System Preparation:

1. Power up the O2 (host computer) and the Gantry.
2. At the login screen, double-click on the Twin-7180 icon.
3. Connect the laptop to the CAN Bus RS-232 cable (from X5 on the MCU MCB) with the security and adapter dongles.
4. Remove the Patient Table sub-frame cover and lift the rubber boot from the side of the sub-frame opposite the gantry. See [Figure 1](#).

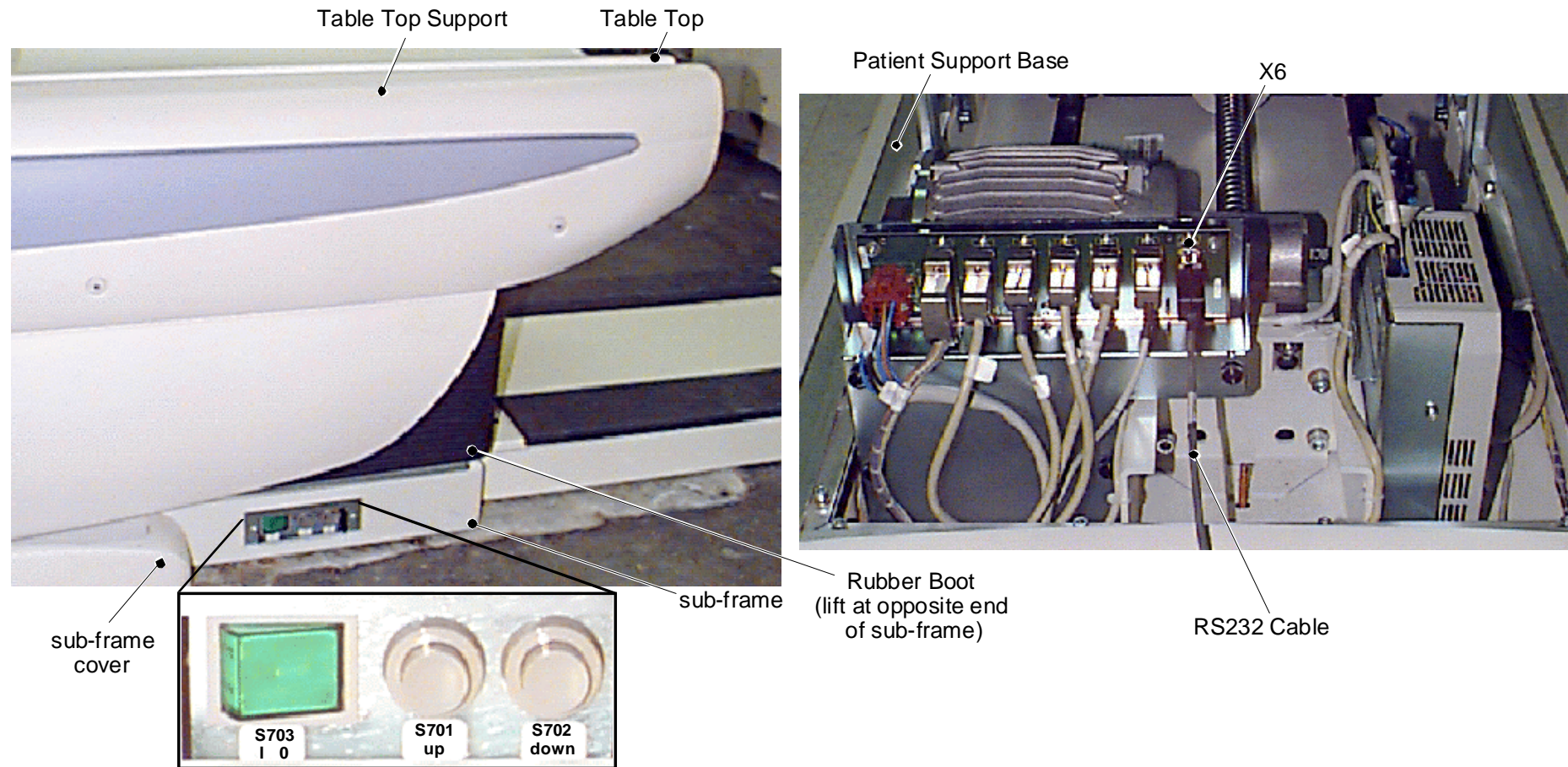


Figure 1 - Patient Table Base and Controller

5. Open the cover of the PTV controller. (Located in the left rear section of the table base.)
6. Turn on the laptop. When the laptop is booted up, open a Hyperterminal screen:
 - a) Double-click on the shortcut to **mx8000.ht** icon.
 - b) From the **file** menu, click on **properties** (this will open to the "connect to" page).
 - c) Make sure the "Connect to" setting is **Direct to Com 1**.
 - d) Click on **Configure**.
 - e) Make sure the settings read as follows, change if necessary:

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1. Bits per second: **9600**
 2. Data bits: **8**
 3. Parity: **None**
 4. Stop bits: **1**
 5. Flow control: **Xon/Xoff**
7. Click **OK**.
 8. Click on the Settings tab.
 9. Make sure that the settings read as follows and change if necessary. Then click on **OK**:
 - 1) Emulation: **VT100**
 - 2) Telnet Terminal: **VT100**
 - 3) Backscroll buffer lines: **500**
 10. Start CanPro and open a new file with the current date as the file name.
 11. Click the Monitor pull-down menu, make sure **Start** is checked. If not, click **Start** to begin monitoring the CAN Bus.
 12. When the Mx8000 Scanner is ready (blue progress bar disappears), move the Table Top and Table Top Support to their outermost positions and adjust the Table to a vertical height of 125mm as read on the Gantry display.
 13. If you are running old CANpro (4.8), select **Logout** from the File pull-down menu of the Patient data Screen. If you are running new CANpro (7.5), **do not logout**.
 14. Check the system state by sending a telegram with CANPro. The identifier = 0, the CAN command = U and the second data field from the left should be 00. See [Figure 2](#) and [Figure 3](#).
 15. If the system is not in standby, perform the following: (Otherwise, continue at step 16).
 - a) Press the **STOP** button on the CT Box. This places the system in the stop state.
 - b) Send a telegram with CanPro. Use identifier = 0 and CAN command = RS. ([Figure 2](#)).
 - c) Watch for the message "Reset Done" from the MCU to All and observe the directional arrows on the CT Box. When the Reset Done appears and the CT Box directional arrows are lit, the Gantry is in standby. See [Figure 3](#).

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Gantry Status Window [?] [X]

State type number:
 Mode type number:

Stop-report opened by:

MCU	<input type="text" value="."/>	XRS	<input type="text" value="."/>
GPC	<input type="text" value="."/>	DLP	<input type="text" value="."/>
RTC	<input type="text" value="."/>	ZCO	<input type="text" value="."/>
PTH	<input type="text" value="."/>	DOM	<input type="text" value="."/>
PTV	<input type="text" value="."/>	ACU	<input type="text" value="."/>

Gantry humidity: %
 Gantry temperature: °C
 DMS temperature: Left Side: °C
 DMS temperature: Right Side: °C

Status bits rotating power supplies:

DPU2+7V	<input type="text" value="OK"/>	DPU1-15V	<input type="text" value="OK"/>
DPU2+5V	<input type="text" value="OK"/>	DPU1+24V	<input type="text" value="OK"/>
DPU2-17V	<input type="text" value="OK"/>	DPU1+48V	<input type="text" value="OK"/>
DPU1+15V	<input type="text" value="OK"/>		

Function available
under Monitor
down menu in
CANpro 2

Send a message on CAN bus [X]

Identifier: 0x
 RTR: ☐

Data Frame

Data length: (0..8)
 CAN command: (e.g., SE)
 Data:

Query the system with 16-bit version of

Figure 2 - Send a message on the CAN Bus

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System in standby →

ID from MCU to ICS →

Reset Done MCU to ALL →

LS from MCU to ICS →

Direction	ID	Data	Description	Source	Destination	Hex ID
=>	099	ID 00 00 00 00 00 00	Init Done	DLP->MCU		56041974
=>	401	00 00	!! unknown SLIO ID	XRS->XRS-XST		56044938
=>	400	20 00	!! unknown SLIO ID	XRS-XST->XRS		56044940
<=	000	U 00 00 00 00 00 00	Table Query	ICS->ALL		56054957
=>	008	T 00 00 00 06 00 00	Table: MCU Status	MCU->ICS		56054958
=>	008	T 00 01 18 15 00 00	Table: MCU Status	MCU->ICS		56064976
=>	008	T 00 00 ab 10 00 02	Table: MCU Status	MCU->ICS		56064977
=>	401	00 00	!! unknown SLIO ID	XRS->XRS-XST		56068168
=>	400	20 00	!! unknown SLIO ID	XRS-XST->XRS		56074636
=>	09a	ID 00 00 00 00 00 00	Init Done	DLP->MCU		56074638
=>	098	ID 00 00 00 00 00 00	Init Done	XRS->SUPER		56074640
=>	401	04 00	!! unknown SLIO ID	XRS->XRS-XST		56074640
=>	400	24 00	!! unknown SLIO ID	XRS-XST->XRS		56074641
=>	008	ID 00 00 00 00 00 00	Init Done	MCU->ICS		56074643
=>	401	1f 08	!! unknown SLIO ID	XRS->XRS-XST		56074643
=>	400	3f 08	!! unknown SLIO ID	XRS-XST->XRS		56074645
=>	085	T 20 bf fd 00 02 05 02	Table: RTC Status	RTC->SUPER		56074645
=>	085	T 20 03 60 00 bf fd ff	Table: RTC Status	RTC->SUPER		56074647
=>	097	RD 00 00 00 00 00 00	Reset Done	PTV->MCU		56054648
=>	001	RD 00 00 00 00 00 00	Reset Done	MCU->ALL		56074649
=>	401	03 00	!! unknown SLIO ID	XRS->XRS-XST		56074650
=>	400	23 00	!! unknown SLIO ID	XRS-XST->XRS		56074651
=>	401	06 00	!! unknown SLIO ID	XRS->XRS-XST		56074652
=>	008	LS 00 00 00 00 00 00	Loaded Scan	MCU->ICS		56074673
=>	401	00 00	!! unknown SLIO ID	XRS->XRS-XST		56074674
=>	400	20 00	!! unknown SLIO ID	XRS-XST->XRS		56084676
SI [0]			pause wait until ID to ICS is done			56086299
SI [0]			next T06			

For Help, press F1 INIT_SB.TSC online 00411 MON

Start Internet Explorer Mx8000 - HyperTerminal CANPRO TEST TOOL 9:12 AM

Figure 3 - CanPro Messages

NOTE: Observe the lights on the CT Box. The arrows for controlling the table and gantry motions should be lit when the system is in standby.

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- a) Check the system state by repeating step 14.
- b) If the Gantry is still not in standby, continue on with steps 15c) through 15f). Otherwise, continue at step 16.
- c) Bring the system to standby mode by selecting the following scenario: **c:\mx8000\scenario\init\INIT_SB.TSC**.
- d) Click on Simulation, Start INIT_SB.TSC to run the scenario.
- e) You will be asked to wait until ID (Init Done) to ICS is complete.
- f) After clicking "OK" when ID to ICS is displayed, click "OK" to the prompt "Ask for FW-ID's and perform reset".

NOTE: If the system is not in standby after running the scenario, press the STOP button and run INIT_SB.TSC again. Otherwise, reboot the scanner and cycle Gantry power.

16. In CanPro, select "Simulation", "Load" from the Monitor pull-down menu on the toolbar and select the following scenario:
CANpro 4.8: **c:\mx8000\scenario\adjust\ PHS\PTVPAR1.TSC** and click "OK".
CANpro 7.5: **c:\CANpro\Machines\<machine name>\scenarios\ADJUST\PHS\ PTVPAR1.TSC**
where <machine name> is the machine directory name you typed in the Select Machine dialog box.
17. Click on Simulation, Start PTVPAR1.TSC to run the program.
18. The scenario will prompt you to "Connect RS232 cable to PTV x6 and PC computer COM". Connect one end of the null RS232 cable (or straight through cable with null adapter) to X6 on the PTV controller board and the other end to Com Port 1 of the laptop and click **OK** to acknowledge the prompt.. Refer to [Figure 1](#).
19. The scenario will prompt you to "open Hyper Terminal window, type CS and Enter". Double-click on the HyperTerminal shortcut to open communication with the PTV controller. The terminal window will usually connect automatically to the PTV (It should say connected, with an incrementing timer in the lower left corner.). If it doesn't, click on **CONNECT**.
20. Type the command **CS** to verify connection to the PTV-MCB and click **OK** to acknowledge the prompt.
21. The scenario will prompt "Couch SERVICE Sw to ON". Locate the three service buttons on the right front of the table base and switch S703 to the service mode (the "1" position). Refer to [Figure 1](#).
22. Click **OK** to acknowledge the prompt.

**WARNING**

With Switch S703 in service mode, the Patient Table can be raised or lowered beyond the S/W defined height limits. In other words, there is no high or low limit with switch S703 in the service position.

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23. The scenario will prompt you to “move the couch UP by SERVICE to 1023mm”. Place a straight edge across the tabletop support at the end of the couch closest to the Gantry. Measuring from the floor to the bottom of the straight edge with a metric tape measure, press switch S701 (UP button) to bring the table up to **1023 mm**. **Make all measurements from the same location.**
24. Click **OK** to acknowledge the prompt.
25. The scenario will prompt you to “Load from Terminal – MAX value”. On the HyperTerminal screen, type **SV 0 [Enter]** and click **OK** to acknowledge the prompt.
26. The scenario will prompt you to “move the couch DOWN by SERVICE to 480mm”. Press switch S702 (DOWN button) to lower the bed to **480 mm** and click **OK** to acknowledge the prompt.
27. The scenario will prompt you to “Load from Terminal – MIN value”. On the hyperterminal screen, type **SV 1 [Enter]** and click **OK** to acknowledge the prompt.

NOTE: If all is well, no error will occur. If an error occurs, return to step 16.

28. The scenario will prompt you to “Open the stop circuit by pressing the STOP button”. Press the **STOP** button on the CT Box and click **OK** to acknowledge the prompt.
29. The scenario will prompt you to “Confirm OK for flash load Start”. Click **OK** to acknowledge the prompt.
30. The scenario will prompt you to “Confirm OK for Flash Load Done”. Click **OK** to acknowledge the prompt.
31. The scenario will prompt “Couch SERVICE Sw to OFF”. Return S703 to normal mode (the “0” position) and click **OK** to acknowledge the prompt.
32. The scenario will prompt you to “Confirm OK for Init Start”. Click **OK** to acknowledge the prompt.
33. Double-click on the Shutdown icon. After the host computer is shut down, press the host computer’s ON button.
34. Double-click on the Twin-7180 icon to start the application software. The system will reinitialize the gantry automatically.
35. After the system is booted and the gantry is in standby, verify that the vertical range of motion of the couch is:

	<u>Gantry Display</u>	<u>Tape Measure</u>
Maximum	107	1000mm ± 1%
Minimum	638	480mm ± 1%

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NOTE: The couch is at its lowest position when the gantry displays the highest number and vice versa.

Since the tolerance of the vertical calibration procedure is +/- 10mm at the highest table position and +/- 5mm at the lowest table position, the Gantry Display may vary from the value in the above table. When verifying the table vertical height calibration, never use the Gantry Display. Always measure from the floor to the bottom of the straight edge and make sure the actual measured height complies with the tolerance without regard to the Gantry Display.

36. Close the HyperTerminal window and remove the laptop from the PTV controller if the vertical range of motion is in tolerance.
37. Reinstall the rubber boot and return the Patient Table sub-frame cover to its original position.
38. This completes Vertical Couch Calibration.